

ABSTRACT

A highly sensitive and compactible target substance sensor for detection of the target substance using a photonic crystal and a method thereof are provided.

The sensor of the present invention includes an electromagnetic wave source of supplying an electromagnetic wave, a photonic sensor element, and a detector. The photonic sensor element has photonic crystalline structure and is configured to include a sensor waveguide for introducing the electromagnetic wave, and a sensing resonator electromagnetically coupled to the sensor waveguide for resonating the electromagnetic wave at specific wavelength. The sensing resonator is exposed to an atmosphere including the target substance so as to vary a characteristic of the electromagnetic wave emitted from the sensing resonator. The detector is configured to receive the electromagnetic wave emitted from the sensing resonator to recognize an intensity variation of the electromagnetic wave and issue a signal indicative of a characteristic of the target substance.